

Original Article

Assessment of diarrheal diseases among children under the age of five and its impacts in health sciences

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Abstract

Diarrheal disease is a leading cause of child mortality and morbidity in the world and mostly results from contaminated food and water sources. From WHO, 780 Million individuals worldwide lack access to improved drinking water and 2.5 million lack improved sanitation. Diarrhea due to infection is widespread throughout developing countries. In developing countries, children under 3 years old experience an average three episodes of diarrhea every year. Each episode deprives the child of the nutrition necessary for growth hence as a result; diarrhea is a major cause of malnutrition. This study therefore intended to determine the causes, control measures and management of diarrheal diseases in North Kamagak Location, Rachuonyo South Sub-County, Kenya. The objectives of the study were to: determine the causes of diarrheal diseases among the under five in the location; find out intervention strategies during diarrheal diseases outbreak among the residents; establish treatment options for diarrhea among the under fives; and identify home management practices of under fives diarrhea in the rural communities. The population of the study involved all fewer than five children in North Kamagak location. Descriptive research design has been used. Stratified random sampling has been used to select 20 households from each of the three sub-locations in the location. Purposive sampling has been used to select 2 children from each selected household. Collected data has been analyzed using descriptive statistics and results presented in terms of tables, charts and graphs. The results obtained from this study show that using dirty water and not washing hands are the major causes of diarrhea. Results are useful to the ministry of health and the public in general in prevention and management of diarrheal diseases.

1. Introduction

Diarrheal disease is a leading cause of child mortality and morbidity in the world and mostly results from contaminated food and water sources. Worldwide 780 Million individuals lack access to improved drinking water and 2.5 million lack improved sanitation. Diarrhea due to infection is widespread throughout developing countries. In developing countries, children under 3 years old experience an average three episodes of diarrhea every year. Each episode deprives the child of the nutrition necessary for growth's a result, diarrhea is a major cause of malnutrition and malnourished children are more likely to fall at risk of diarrhea.

2. Methods

2.1 Dehydration

The most severe threat posed by diarrhea is dehydration. During a diarrheal episode, water and electrolytes (sodium, chloride, potassium and bicarbonate) are lost through liquid stools, vomit, sweat, urine and breathing. Dehydration occurs when those losses are not replaced.

2.2 Statement of the problem

Diarrhea continues to be a major cause of death among young children and it has major economic impacts[1]. Although it is a preventable disease, the incident rate of diarrheal diseases continues to rise and is currently the second leading killer disease of under five children in the world[3]. In Kenya, it is also a leading cause of childhood

mortality and morbidity [2]. Childhood mortality due to diarrhea is even higher among the rural since it comprises mostly of the poor who in many occasions lack the basic education. In rural community of North Kamagak location the leading cause of childhood mortality and morbidity as diarrhea. This prompted the researcher to determine the causes, control measures and management of diarrheal diseases in North Kamagak Location, Rachuonyo South Sub-County, Kenya.

2.3 Purpose of the study

The study sought to determine the causes, control measures and management of diarrheal diseases in North Kamagak Location, Rachuonyo South Sub-County, Kenya. The specific objectives of the study were to: determine the causes of diarrheal diseases among the under five in the location; find out intervention strategies during diarrheal disease outbreak among the residents; establish treatment options for diarrhea among the under fives; and identify home management practices of under fives diarrhea in the rural communities.

2.4 Justification of the study

This study is very necessary to be carried out in the village since it aims at identifying the main causes of diarrheal diseases among the under five children in the village thus creating awareness on them. It is after identifying the causes of diarrhea that several interventions will come in. These interventions include the curative for those who are affected, prevention and control aspects of the disease. This study is also

important as it will enlighten various care takers like mothers to take various precautions when taking care of the under five children.

2.5 Significance of the study

The significance includes:

- Various interventions will be taken to control and prevent diarrheal diseases after highlighting the sources of infections.
- The burden of diarrhea of the under five will be reduced in the village thus a relief to the parents and care givers
- The problem of malnourished children and children who are at higher risk of other diseases as a result of weak immunity will be minimal.
- Reoccurrences of diarrheal diseases will not be a threat since majority of the people will be informed about the modes of transmission.
- The costs of medical care among the families will reduce since they will be able to manage cases of diarrhea in its early stages thus reduces incidences of chronic diarrhea.

3. Results

Diarrheal is a common symptom of gastro-intestinal infections caused by an under range of pathogens, including bacteria, viruses and protozoa. Just a handful of organisms are responsible for most cases of childhood diarrhea. However, Rotavirus is the leading cause of acute diarrhea and is responsible for about 40% of all hospital admission due to diarrhea among the under five worldwide. Other major bacterial pathogens include *E. Coli*, Shigella, *Campylobacter* along with *V. Cholerae* during epidemics, *Cryptosporidium* has been the most frequently isolated Protozoan pathogen among children soon at health facilities and is frequently found among the HIV positive patients. Diarrheal diseases account for in a child's death worldwide, making diarrhea the second leading cause of death among children under the age of five. For children with HIV diarrhea is even more deadly; the death rate for those children is 11 times higher than the rate for children without HIV. Despite this sobering statistics, strides made over the last twenty years have shown that in addition to Rotavirus vaccination and breastfeeding, diarrhea prevention focused on safe drinking water and improved hygiene and sanitation is not only possible but cost effective.

Diarrhoea remains an important cause of mobility and mortality among children aged five and below in most developing countries of the world. According to an estimate diarrhea is reported to be responsible for close to two million deaths annually in this group. In sub Saharan Africa the occurrence of diarrhea like other infectious diseases has been associated with poverty. Timely admissions of ORS and more recently zinc tablets have been recognized. Of the estimated total 10.6 million deaths among children younger than five years of age worldwide, 42 percent in WHO African region. Although mortality rate among those children have declined globally from 146 per 1000 in 1970 to 76 per 1000 in 2003 [1] the situation in Africa is strikingly different as compared with other regions of the world. The African region shows the smallest reduction in mortality rate most marked showing down trend. The mortality of the under five rate in the African region is seven times higher than that in the European region in 1980. This difference was equal to 4.3 times [2].

During the 1990's the decline of the under five mortality rates in 29 countries of the world stagnated and in 14 countries rates went down but then increased again. Most of these countries are from WHO African region. A factor that may contribute to this situation is the HIV/AIDS epidemic in the region, but an underlying weakness of the implementation capacity of the health system is also likely to blame [1]. Similarly to all cause- mortality, global estimates of the number of deaths due to diarrhea have shown a steady decline from 4.6 million in the 1980's [3] to 3.3 million in the 1990's [2] to 2.5 million in the year 2000 [3]. However, diarrheal diseases continue to be an important cause of mobility and mortality worldwide, and despite all advances in health

technology, improved management and increase of ORT in the past decades, they remain among the five major killer of children under five years of age. In contrast to mortality trends, morbidity due to diarrhea has not shown a parallel decline and global estimates remain between 2 to 3 episodes of diarrhea per child under five per year [2] estimated a global median incidence of diarrhea to be 3.2 episodes per child -under five years per year in 2002. Similarly to those found in previous as well as for those reported in the first edition of disease control priorities in developing countries [3].

The global enteric multicenter study (GEMS) IS the largest most comprehensive study of childhood diarrhea diseases to date. Founded by the Bill and Melinda Gates foundation, the GEMS study identified the diarrhea causing pathogens the burden of diarrheal illness and its consequences across the seven GEMS sites in the developing countries (Mali, Gambia, Kenya, Mozambique, India, Bangladesh and Pakistan) over a three year period. The GEMS site in Kenya was located within the Kenya Medical Research Institute (KEMRI) and Centre for Disease Control and Prevention (CDC) Health and Demographic Surveillance system area in Nyanza province Western Kenya. This site was selected because of its high HIV prevalence and low access to critical interventions including ORS and improved water services. KEMRI and CDC scientists conducted the study over seen by principal investigator Robert Breinman with support from CDC's Division of food borne, waterborne and environmental diseases. Four pathogens-Rotavirus, *Cryptosporidium*, Shigella and *E. Coli* caused the majority of moderate to severe diarrhea in Nyanza. The burden of moderate to severe diarrhea was higher in infants and decreased with age. Typical enteropathogenic (TEPEC) another type of *E. Coli* caused a significant burden of moderate to severe diarrhea and elevated mortality risk. Overall, moderate to severe diarrhea incidence among infants in Kenya was the highest of all GEM's sites.

3.1 Roles of interventions to control diarrhoea

Key measures to prevent diarrhoea include;

- Access to safe drinking water
- Use of improved sanitation.
- Hand washing with soap.
- Exclusive breastfeeding for first six months of life.
- Good personal and food hygiene
- Health education about how infections spread
- Rota virus vaccination

There is sufficient evidence that several interventions are effective in the prevention and treatment of diarrhoea diseases (Jones et al 2003). These interventions are exclusive breast feeding, complimentary feeding, safe water, good sanitation and hygiene, zinc and vitamin A supplementations, ORT, and antibiotics for dysentery. It is estimated that these interventions could prevent 22 percent of deaths due diarrhoea. Most of these interventions are feasible for implementation in low income countries such as those in African region. However, the capacity to deliver these important interventions effectively should be strengthened. The availability of safe and effective Rota virus vaccine introduced in several countries in Latin America in 2005 is likely to compliment these interventions. However, the stability of diarrhoea rates observed in all reviews done since 1980s show that despite the reduction of diarrhoea mortality, most likely through better case management, very little has been done to prevent transmission of diarrheal diseases. The progress towards better water and sanitation observed in other regions has not yielded a reduction of diarrhoea morbidity, suggested that poor hygiene practices and ingestion of contaminated food may be the most important factor and where preventive interventions like hand washing should be promoted.

3.2 Accessibility of health care facilities

The goal of any health care system is to provide universal access to appropriate, efficient, effective and quality health services in

order to improve and promote people's health. In most developing countries, the 1970s saw grave inequalities in the provision of health services and a worsening burden of disease within rising costs. As a result, in mid 70s, international health organizations began exploring different approaches to improve health. During this period China had made significant achievements in health program which compared to developing countries disease focus programmes were community based. This bottom up approach, which focuses on prevention and management of health problems in their social setting turned out to be the better option to the typical top down technological approach and rekindled hope about the possibility of addressing inequality to improve universal health. Thus in 1978, health for all was introduced and endorsed at the international conference on primary health care (PHC) in Alma Ata declaration. To achieve the goal of health for all, global organizations and national governments promised to work together toward providing people with basic health needs throughout comprehensive approach called primary health care.

3.3 Treatment options for diarrhea

Millennium development goal 4; reduce child mortality. Target: reduce by two thirds, between 1990 and 2015, the under five mortality. The recommended treatment for children under five with diarrhea is oral rehydration therapy (oral rehydration salts or recommended homemade fluids or increased fluids) along with continued feeding practices. While trend data are limited, data from 26 sub Saharan African countries with comparable data available for around 2000 and 2006, causing nearly half of the African under five populations indicate that there has been little progress in increasing only from 32 percent in 2000 to 38 percent in 2008. In fact, there has been little progress in expanding case management for major childhood illness across sub Saharan Africa, where the burdens of these diseases are greatest. The lack of any significant progress in the case management of pneumonia, diarrhea l diseases and malaria underlines the urgent need to strengthen the integrated community based treatment of childhood diseases within the overall health system. In 2004 the UNICEF and WHO revised their recommendation for management of acute diarrhea in children to include zinc treatment as well as ORS. The above study investigated the factors that influence the household choice of treatments for children suffering from diarrhea in Kenya using a multinomial logic approach. A sample of 771 under five children was drawn from the 2008 and 2009 Kenya Demographic and Health survey. It was found that 29.86 percent of the children were not administered with any sort of treatment for their diarrhea. It was surprising to note that only 4 of the affected children were given zinc supplements. The study found that prior knowledge or experience of ORS, mothers' education level, place of residence; household wealth and birth spacing were key factors determining the use of recommended treatments for childhood diarrhea. Given the inadequate of low usage of ORT and zinc supplement respectively, the study recommended strengthening awareness on childhood diarrhea and the recommended treatment that can be used to manage it as well as increasing the availability and accessibility of zinc supplement.

3.4 Home management of under five diarrhea in rural community: household perception and practices

Diarrhea remains one of the leading killers of young children. Perception of mothers regarding causes of diarrhea in children is a recipe to timely and proper management at home and subsequent referral for skilled care. The education of mother on home management of diarrhea and proper use of ORS can significantly reduce complications related to diarrhea of the under fives. A study by [3] revealed that majority of mothers perceived that diarrhea was caused by teething. In most of the cases, Mothers treated diarrhea with a combination of drugs including antibiotics anti-diarrheal and herbal medicine. These drugs were prescribed mainly by mothers themselves and local shopkeepers.

Knowledge on the adverse effects of the drugs was found to be minimal hence underscoring the need for appropriate primary care education among mothers and care givers. WHO indicated that a two week course of zinc once daily significantly reduce severity and duration of diarrhea and mortality in young children.[1] The need for adequate instructions to the mothers on administration of the zinc tablets was underscored. Snyder and Merson revealed that although nearly all mothers know that oral rehydration solutions could replenish lost fluids, its inability to stop diarrhea caused them to seek antibiotics from local markets, traditional medicine or anti-malarial to cure the illness.[2] Parents often declared ORS insufficient and judged that an additional treatment should be combined with it to cure diarrhea. WHO showed that use of ORS during childhood diarrhea at home was popular among infants a smaller household.[1] ORS was used mostly by non farming, young and literate mothers. The finding suggested that the use of ORS is associated with mother's ability to allocate time to health care and her general position in the household since mothers-in-law and husbands also made decision on the management of sick children at home.

References

- [1] WHO. World health report 2004; changing history. Geneva; world health organization, 2004.
- [2] Snyder J. D. and Merson M. H. The magnitude of the global problem of acute diarrheal diseases; a review of active surveillance data. *Bull world health organ.* 1982; 60: 604-613.
- [3] Bern C, Martines J. and Glass R. I. The magnitude of the global problem of diarrheal diseases; a ten year update. *Bull World health organ,* 1992; 70: 705 -714.